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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,961	10/27/2003	Terry L. Gilton	MI22-2428	8007

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EXAMINER	
LANDAU, MATTHEW C	
ART UNIT	**PAPER NUMBER**
2815	

DATE MAILED: 11/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/695,961	GILTON, TERRY L.	
	Examiner	Art Unit	
	Matthew Landau	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 47-69 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 47-69 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 27 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 12/31/2003.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 47-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Schultze et al. ("Regular nanostructured systems....", hereinafter Schultze).

Regarding claim 47, Schultze discloses an active molecular switchable material within a porous silicon matrix (see abstract). Schutlze discloses the material within the pores can be electrochemically switched between two different conducting states (see abstract). In order for something to be electrochemically switched, there must be a current/voltage passing through/applied to the material. Therefore, the material must be in some type of circuit that supplies the current/voltage. Also, the limitation "memory material" is merely a recitation of intended use that does not structurally distinguish the claimed invention over Schultze. The claim is simply drawn to a switchable circuit device. The material disclosed by Schultze can be switched from one conductive state to the other and can therefore be used as a memory material in a memory device.

Regarding claim 48, Schultze discloses the molecular switchable material substantially completely fills the porous matrix (page 1375, col. 1, lines 4-7).

Regarding claim 49, Schultze discloses the molecular switchable material only partially fills the porous matrix (page 1379, last two lines).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 47, 50, 54, 55, 57, 61, and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky et al. (US Pat. 6,087,674, hereinafter Ovshinsky) in view of Schultze.

Regarding claims 47, 50, 54, and 56, Figure 1 of Ovshinsky discloses a switchable circuit device comprising: a switchable memory material 36 that has two stable states (phases) (col. 3, lines 10-33); the switchable material is supported by a semiconductor substrate 10; the switchable material has a first side and a second side in opposing relation to the first side; a first conductive line/layer 8A is on the first side; a second line/layer 6 is on the second side of the porous silicon; and a current flow from the first conductive line to the second conductive line depends on which of the stable states the active molecular switchable memory material is in. The difference between Ovshinsky and the claimed invention is an active molecular switchable memory material within a porous silicon matrix. Schultze discloses an active molecular switchable material within a porous silicon matrix (see abstract), wherein the material within the pores can be electrochemically switched between two different conducting states (see abstract). Schultze also discloses the two stable states of the material are interchanged by oxidation and reduction of the material (page 1374, 2nd col., lines 6-9). In view of such

teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Ovshinsky by using the molecular switchable material in a porous silicon matrix as taught by Schultze for the purpose of using a switchable material with a faster switching speed that occupies less space.

Regarding claim 55, Ovshinsky discloses an embodiment where the material 36 has only two stable states accessible during operation of the device (col. 3, lines 12-17).

Regarding claim 57, Ovshinsky discloses the two stable states of the material are interchanged by changing a voltage that the material is exposed to (col. 3, lines 12-17).

Regarding claims 61 and 62, Figures 1 and 3 of Ovshinsky disclose a semiconductor construction, comprising a semiconductor substrate 10; an insulative material 39 over the semiconductor substrate; trenches extending within the insulative material; a first conductive wiring layer 8A/12 within the trenches and partially filing the trenches; a switchable memory material 36 over the first conductive layer; and a second conductive wiring layer 6/42 over the memory material. Figure 3 of Ovshinsky discloses an array of multiple memory elements 30, which have the same construction as that shown in Figure 1. Therefore, Ovshinsky discloses more than one trench over the substrate. The difference between Ovshinsky and the claimed invention is an active molecular switchable memory material within a porous silicon matrix. Schultze discloses an active molecular switchable material within a porous silicon matrix (see abstract), wherein the material within the pores can be electrochemically switched between two different conducting states (see abstract). Schultze also discloses the two stable states of the material are interchanged by oxidation and reduction of the material (page 1374, 2nd col., lines 6-9). In view of such teaching, it would have been obvious to the ordinary

artisan at the time the invention was made to modify the invention of Ovshinsky by using the molecular switchable material in a porous silicon matrix as taught by Schultze for the purpose of using a switchable material with a faster switching speed while occupying less space.

Regarding claim 69, Figure 3 of Ovshinsky discloses the first conductive wiring layer 8A/12 defines lines extending primarily along a first direction; and wherein the second conductive wiring layer is formed in a shape of a line extending primarily along a second direction substantially perpendicular to the first direction.

Claims 51-53, 58-60, and 63-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ovshinsky as applied to claims 47, 54, and 61 above, and further in view of Heath et al. (US Pat. 6,756,296, hereinafter Heath).

Regarding claims 51-53, 58-60, and 63-65, a further difference between Ovshinsky and the claimed invention is the active molecular switchable material comprises redox-active catenane, rotaxane, or pseudorotaxane. Figure 3 of Heath discloses a memory device (col. 5, lines 56-60 and col. 12, lines 52-65) comprising a bistable molecular switchable material 13 made from rotaxane, pseudorotaxane, or catenane (col. 7, lines 1-5). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to further modify the invention of Ovshinsky by using the switchable material of Heath for the purpose of selecting an active molecular switchable material that is well known in the art to have good switching characteristics.

Regarding claims 66-68, a further difference between Ovshinsky and the claimed invention is the first and second wiring layers comprise conductively doped silicon, and the first wiring layer is doped with n-type dopant. Figure 3 of Heath discloses a memory device with a molecular switchable material between first and second electrodes (12 and 18, respectively). Heath discloses the first electrode is made of n-doped silicon (col. 9, lines 40-42) and the second electrode is made of amorphous silicon (col. 7, lines 65-67). Note that amorphous silicon must be doped to be function as a conductive electrode. In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to further modify the invention of Ovshinsky by using the electrode materials of Heath for the purpose of selecting well-known, inexpensive conductive materials.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (571) 272-1731.

The examiner can normally be reached from 8:30 AM - 5:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Matthew C. Landau

Examiner

November 4, 2004

Tom Thomas

TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800